



[4910-13-P]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2019-0392; Product Identifier 2019-CE-020-AD; Amendment 39-19639; AD 2019-08-51]

RIN 2120-AA64

Airworthiness Directives; Cirrus Design Corporation

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule; request for comments.

SUMMARY: The FAA is adopting a new airworthiness directive (AD) for all Cirrus Design Corporation (Cirrus) Model SF50 airplanes. This AD was sent previously as an emergency AD to all known U.S. owners and operators of these airplanes. This AD requires replacing the angle of attack (AOA) sensors with improved AOA sensors. This AD was prompted by three incidents on Cirrus Model SF50 airplanes of the stall warning and protection system (SWPS) or Electronic Stability & Protection (ESP) System engaging when not appropriate. The FAA is issuing this AD to address the unsafe condition on these products.

DATES: This AD is effective [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER] to all persons except those persons to whom it was made immediately effective by Emergency AD 2019-08-51, issued on April 18, 2019, which contained the requirements of this amendment.

The Director of the Federal Register approved the incorporation by reference of a certain publication identified in this AD as of [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER].

The FAA must receive comments on this AD by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- Federal eRulemaking Portal: Go to <http://www.regulations.gov>. Follow the instructions for submitting comments.
- Fax: 202-493-2251.
- Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590.
- Hand Delivery: Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For service information identified in this final rule, contact Cirrus Worldwide Headquarters, 4515 Taylor Circle, Duluth, Minnesota, 55811; telephone: (800) 921-2737 or after hours (800) 921-2737; fax: (218) 788-3500; email: fieldservice@cirrusaircraft.com; Internet: <https://cirrusaircraft.com/service-support/>. You may view this referenced service information at the FAA, Policy and Innovation, 901 Locust, Kansas City, Missouri 64106. For information on the availability of this material at the FAA, call (816) 329-4148. It is also available on the Internet at <http://www.regulations.gov> by searching for locating Docket No. FAA-2019-0392.

Examining the AD Docket

You may examine the AD docket on the Internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2019-0392; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this final rule, the regulatory evaluation, any comments received, and other information. The street address for Docket Operations (phone: 800-647-5527) is listed above. Comments will be available in the AD docket shortly after receipt.

FOR FURTHER INFORMATION CONTACT: Wess Rouse, Small Airplane Program Manager, 2300 East Devon Avenue, Room 107, Des Plaines, Illinois 60018; telephone: (847) 294-8113; fax: (847) 294-7834; email: wess.rouse@faa.gov.

SUPPLEMENTARY INFORMATION:

Discussion

On April 18, 2019, we issued Emergency AD 2019-08-51, which requires replacing the AOA sensors with improved AOA sensors. Emergency AD 2019-08-51 was sent previously to all known U.S. owners and operators of Cirrus Model SF50 airplanes. This action was prompted by reports of three incidents on Cirrus Model SF50 airplanes of the SWPS or ESP System engaging when not appropriate. The SWPS or ESP systems may engage even when sufficient airspeed and proper angle of AOA exists for normal flight. The SWPS includes the stall warning alarm, stick shaker, and stick pusher. The ESP includes under speed protection (USP). The SWPS or the ESP systems engaging inappropriately could potentially result in a stall warning crew alert (CAS) message activation, accompanied by an audio alarm and stick shaker activation, followed possibly by either low speed ESP/USP engaging, and the stick pusher engaging. The pilot will also observe the dynamic and color-coded (Red) airspeed awareness ranges displaying the stall band, regardless of actual indicated airspeed.

The information below presents detailed information on the three incidents.

1. While the airplane was under manual pilot control, the airplane activated several downward pitch commands coincident with stall warning, stick shaker, and several associated alerts. The pilot reported “AOA FAIL” and “STICK PUSHER FAIL CAS” messages preceding the pitch command. The pilot was able to stop

the automatic pitch commands by pressing and holding the autopilot disconnect button in accordance with the emergency procedure in the airplane flight manual and safely landed at his destination.

2. The operator reported stall warning and stick pusher failure in flight.
3. The airspeed indicator went red and the stall warning and stick shaker were heard and felt while on descent. The autopilot was disengaged with the same results. The system settled with stick pusher fail, stall warning fail, and LSA fail under the airspeed. The pilot hand flew the approach and had no V_{REF} indicator but AOA appeared to be operating normally.

Cirrus and Aerosonic (manufacturer of the technical standard order AOA sensor) have identified the probable root cause as an AOA sensor malfunction due to a quality escape in the assembly of the AOA sensor at Aerosonic. Two set screws that secure the potentiometer shaft to the AOA vane shaft may have improper torquing and no application of thread locker (Loctite) to secure the two set screws. The AOA sensor with this quality escape is labeled with part number 4677-03.

Potential erroneous AOA derived indications may occur before, during, and after unintended automatic control system engagement. These indications include an abnormal appearing low speed red band or VREF green donut presented on the airspeed tape.

Failed indications or intermittent indication may result in one or more of the following:

- Unintended automatic flight control activations;
- The flight crew having difficulty controlling the airplane;
- Excessive nose-down attitude; and/or
- Possible impact with terrain.

We are issuing this AD to address the unsafe condition on these products.

Related Service Information under 1 CFR part 51

The FAA reviewed Cirrus Design Corporation SF50 Service Bulletin Number: SB5X-34-03, dated April 16, 2019 (SB5X-34-03). The service information provides instructions for replacing the AOA sensor with an improved flight sensor. The FAA also reviewed Cirrus SF50 Alert Service Advisory SA19-08, dated April 8, 2019. This service information provides instructions for the pilot to follow in the event the AOA sensor fails in flight. This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in the ADDRESSES section.

FAA's Determination

The FAA is issuing this AD because we evaluated all the relevant information and determined the unsafe condition described previously is likely to exist or develop in other products of these same type designs.

FAA's Justification and Determination of the Effective Date

An unsafe condition exists that required the immediate adoption of Emergency AD 2019-08-51, issued on April 18, 2019, to all known U.S. owners and operators of these airplanes. The FAA found that the risk to the flying public justified waiving notice and comment prior to adoption of this rule because the noted condition presents an immediate danger to pilots and passengers of Cirrus Model SF50 airplanes. An uncommanded pitch down may be difficult to recover from in some flight regimes with potential fatal consequences. The brief time to replace the AOA sensors due to the potential fatal consequences does not allow for prior notice and opportunity to comment for the public.

These conditions still exist and the AD is hereby published in the Federal Register as an amendment to section 39.13 of the Federal Aviation Regulations (14 CFR 39.13) to make it effective to all persons. Therefore, the FAA finds good cause that

notice and opportunity for prior public comment are impracticable. In addition, for the reason(s) stated above, the FAA finds that good cause exists for making this amendment effective in less than 30 days.

Differences Between This AD and the Service Information

SB5X-34-03 specifies 5 hours time-in-service (TIS) before replacing the AOA sensors. The FAA determined that allowing 5 hours TIS to replace the AOA sensors does not mitigate the unsafe condition; thus, this AD requires such replacement before further flight.

Comments Invited

This AD is a final rule that involves requirements affecting flight safety and was not preceded by notice and an opportunity for public comment. However, the FAA invites you to send any written data, views, or arguments about this final rule. Send your comments to an address listed under the ADDRESSES section. Include the docket number FAA-2019-0392 and Product Identifier 2019-CE-020-AD at the beginning of your comments. The FAA specifically invites comments on the overall regulatory, economic, environmental, and energy aspects of this final rule. The FAA will consider all comments received by the closing date and may amend this final rule because of those comments.

The FAA will post all comments we receive, without change, to <http://www.regulations.gov>, including any personal information you provide. The FAA will also post a report summarizing each substantive verbal contact we receive about this final rule.

Costs of Compliance

The FAA estimates that this AD affects 99 airplanes of U.S. registry.

The FAA estimates the following costs to comply with this AD:

Estimated costs

Action	Labor cost	Parts cost	Cost per product	Cost on U.S. operators
Replace the AOA sensor	1.25 work-hours X \$85 per hour = \$106.25	\$16,250	\$16,356.25	\$1,619,268.75

According to the manufacturer, all of the costs of this AD may be covered under warranty, thereby reducing the cost impact on affected individuals. The FAA does not control warranty coverage for affected individuals. As a result, the FAA has included all costs in our cost estimate.

Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs describes in more detail the scope of the Agency's authority.

The FAA is issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

This AD is issued in accordance with authority delegated by the Executive Director, Aircraft Certification Service, as authorized by FAA Order 8000.51C. In

accordance with that order, issuance of ADs is normally a function of the Compliance and Airworthiness Division, but during this transition period, the Executive Director has delegated the authority to issue ADs applicable to small airplanes, gliders, balloons, airships, domestic business jet transport airplanes, and associated appliances to the Director of the Policy and Innovation Division.

Regulatory Findings

This AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that this AD:

- (1) Is not a “significant regulatory action” under Executive Order 12866,
- (2) Is not a “significant rule” under DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979),
- (3) Will not affect intrastate aviation in Alaska, and
- (4) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

Adoption of the Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA amends 14 CFR part 39 as follows:

PART 39 - AIRWORTHINESS DIRECTIVES

- 1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. The FAA amends § 39.13 by adding the following new airworthiness directive (AD):

2019-08-51 **Cirrus Design Corporation**: Amendment 39-19639; Docket No. FAA-2019-0392; Product Identifier 2019-CE-020-AD.

(a) Effective Date

This AD is effective [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER] to all persons except those persons to whom it was made immediately effective by Emergency AD 2019-08-51, issued on April 18, 2019, which contained the requirements of this amendment.

(b) Affected ADs

None.

(c) Applicability

This AD applies to Cirrus Design Corporation Model SF50 airplanes, all serial numbers, certificated in standard category.

(d) Subject

Joint Aircraft System Component (JASC)/Air Transport Association (ATA) of America Code 27; Flight Controls.

(e) Unsafe Condition

This AD was prompted by Cirrus reporting three incidents of the stall warning and protection system (SWPS) or Electronic Stability & Protection (ESP) System engaging when not appropriate. The SWPS and ESP may engage even when sufficient airspeed and proper angle of attack (AOA) exists for normal flight. SWPS includes the stall warning alarm, stick shaker and stick pusher. ESP includes under speed protection (USP). The SWPS and ESP engaging could potentially result in a STALL WARNING crew alert (CAS) message activation, accompanied by an audio alarm and stick shaker

activation, followed possibly by either low speed ESP/USP engaging and/or the stick pusher engaging. The pilot will also observe the dynamic and color-coded (Red) airspeed awareness ranges displaying the stall band, regardless of actual indicated airspeed. These conditions, if not addressed, could result in the flight crew having difficulty controlling the airplane, lead to excessive nose-down attitude, significant altitude loss, and possible impact with terrain.

(f) Compliance

Comply with this AD within the compliance times specified, unless already done.

(g) Corrective Action

(1) Before further flight after the effective date of this AD, replace the AOA sensor with an improved AOA sensor, Aerosonic part number 4677-03 Mod 1 or Cirrus part number 32159-004 in accordance with section 11. ACCOMPLISHMENT INSTRUCTIONS, paragraphs A, B, and C of Cirrus Design Corporation SF50 Service Bulletin Number: SB5X-34-03, dated April 16, 2019.

(2) Before further flight after replacement of the AOA sensor per paragraph (g)(1) of this AD, perform final installation checkout procedures and flight tests in accordance with a method approved by the Manager, FAA, Chicago ACO Branch. For the checkout procedures and flight test to be approved by the Manager, FAA, Chicago ACO Branch as required by this paragraph, the Manager's approval letter must specifically refer to this AD.

(3) As of the effective date of this AD, do not install any AOA sensor on any affected airplane unless it is an improved AOA sensor as identified in paragraph (g)(1) of this AD.

(h) Special Flight Permit

A special flight permit is allowed with the following limitation: Operators may fly the airplane to a location where the modification/corrective action can be incorporated. However, the pilot must follow the procedures listed in section 4., Pilot Actions Required, in Cirrus SF50 Alert Service Advisory SA19-08, dated April 8, 2019.

(i) Alternative Methods of Compliance (AMOCs)

(1) The Manager, Chicago ACO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (j)(1) of this AD.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(j) Related Information

(1) For further information about this AD, contact: Wess Rouse, Small Airplane Program Manager, 2300 East Devon Avenue, Room 107, Des Plaines, Illinois 60018; telephone: (847) 294-8113; fax: (847) 294-7834; email: wess.rouse@faa.gov.

(2) For additional information related to this AD, you may refer to Cirrus SF50 Alert Service Advisory SA19-08, dated April 8, 2019.

(k) Material Incorporated by Reference

(1) The Director of the Federal Register approved the incorporation by reference (IBR) of the service information listed in this paragraph under 5 U.S.C. 552(a) and 1 CFR part 51.

(2) You must use this service information as applicable to do the actions required by this AD, unless the AD specifies otherwise.

(i) Cirrus Design Corporation SF50 Service Bulletin Number: SB5X-34-03, dated April 16, 2019.

(ii) Cirrus SF50 Alert Service Advisory SA19-08, dated April 8, 2019.

(3) For service information identified in this AD, contact Cirrus Worldwide Headquarters, 4515 Taylor Circle, Duluth, Minnesota, 55811; telephone: (800) 921-2737 or after hours (800) 921-2737; fax: (218) 788-3500; email: fieldservice@cirrusaircraft.com; Internet: <https://cirrusaircraft.com/service-support/>.

(4) You may view this service information at FAA, Small Airplane Standards Branch, 901 Locust, Kansas City, Missouri 64106. For information on the availability of this material at the FAA, call (816) 329-4148. For information on the availability of this material at the FAA, call (816) 329-4148.

(5) You may view this service information that is incorporated by reference at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: <http://www.archives.gov/federal-register/cfr/ibr-locations.html>.

Issued in Kansas City, Missouri, on June 10, 2019.

Melvin J. Johnson
Aircraft Certification Service
Deputy Director, Policy and Innovation Division, AIR-601

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